



## **ANNEX A**

Annex detailing alternatives  
to Ground-Mounted Solar “Farms”

Objection to development at  
Maggotts End, Manuden  
(Pelham Spring Solar Farm)

PINS Reference: S62A/22/0011

## APPENDIX 1

### Targets set for solar energy generation can be met without a significant expansion in ground-mounted solar production

1. In its Net Zero Technical Report, the Climate Change Committee has called for 54GW of installed solar capacity by 2035<sup>1</sup>. This requirement could be satisfied almost entirely by deploying solar on brownfield sites. A 2023 report published by CPRE<sup>2</sup> concludes as follows:

*“Initial analysis by CPRE, using highly conservative estimates, shows that if only a quarter of the UK’s total 250,000 hectares of south-facing commercial roof space was useable, it could generate 25GW electricity annually. Add that to the 8GW available by covering the country’s car parking spaces with solar panels and the 14.5GW of solar capacity already installed and you have 47.5GW taken care of. With ambition, it’s clear we could generate more or less all the country’s solar power in a way that would enjoy widespread public support”.*

2. The availability of significant capacity for roof-top solar generation was identified at least as early as 2014, when Greg Barker<sup>3</sup> noted that:

*“We want to move the emphasis for growth away from large solar farms and instead focus on opening up the solar market for the UK’s estimated 250,000 hectares of south facing commercial rooftops. Solar increasingly offers efficient and cost effective onsite generation opportunities to both businesses and domestic consumers, and our strategy makes a step change in our ambition for both. as a means to generate renewable energy”.*

3. More recently, a research project, commissioned by the UK warehousing association (“UKWA”) concluded that:

*“UK warehousing has the roof space for up to 15GW of new solar, which would double the UK’s solar PV capacity. This could meet National Grid’s minimum requirements for solar expansion by 2030 according to their 2022 future energy scenarios (FES), producing up to 13.8 TWh of electricity per year enabling the warehouse sector to become a net producer of green electricity. Rooftop solar PV in warehousing can play a significant role in delivering local renewable energy, particularly in urban areas where limited alternative options are available due to land and planning constraints. The UK’s 20% largest warehouses can provide 75million square metres of roof space, avoiding the need to develop new land equivalent to the footprint of 500,000 houses”.*

4. In 2021, the government published the results of a study to understand the factors that influence the adoption of rooftop solar photovoltaic (PV) panels for households and small

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1. <sup>1</sup> <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-Technical-report-CCC.pdf>

2. <sup>2</sup> <https://www.cpre.org.uk/opinions/renewable-energy-is-the-future-and-it-can-give-power-back-to-communities/>

3. <sup>3</sup> <https://www.gov.uk/government/news/the-uks-rooftops-to-become-power-stations>

and medium-sized enterprises (SMEs)<sup>4</sup>. The key conclusions of this research was that there was considerable potential to drive greater adoption of solar PV to help meet net zero commitments given that:

- The commercial viability of solar is the primary concern for SMEs. The economics are attractive over a 5–10-year horizon
  - the cost of rooftop solar panel installation has declined by 60% since 2010, with group purchase schemes offering to the potential to bring average household costs below £4000.
  - there have been very positive experiences of both household and SME Adopters in this study, with expectations met or exceeded in terms of efficiency savings, ease of purchase, maintenance and reliability, and environmental benefits.
  - rooftop solar offers less disruption and greater familiarity relative to other low carbon measures, such as wall and floor insulations and heat pumps.
  - there is headroom for expansion, particularly given the low deployment footprint in urban areas such as London.
5. A development undertaken by a partnership comprising Bridport Cohousing, BCHA, Clean Energy Prospector and Bristol Energy Cooperative<sup>5</sup> is one example of a project which demonstrated the potential for clean, green, locally generated energy for residents. Giant solar panels cover much of the roof spaces, with power generated by every home stored on-site in a high-capacity shared battery and redistributed for all customers. Half of the homes will be available for social rent through BCHA while the other half are for shared ownership, either at 80 per cent leasehold purchase, or through the Help to Buy scheme.

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<sup>4</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1001896/uk-rooftop-solar-panel-behavioural-research.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001896/uk-rooftop-solar-panel-behavioural-research.pdf)

<sup>5</sup> <https://www.bcha.org.uk/media/latest-news/introducing-%E2%80%98hazelmead%E2%80%99,-bridport-cohousing-%E2%80%93-a-beacon-of-inspiration-for-tackling-the-global-climate-crisis/>



6. In Germany, the installation of solar panels on the roofs of buildings is mandatory in Baden-Wuerttemberg and North Rhine-Westphalia, while Berlin, Hamburg, Rhineland-Palatinate, Bavaria, Schleswig-Holstein, and Lower Saxony have adopted laws introducing the obligation as of January 1, 2023. As at June 2022, Germany had just under **43 GW (43,000 MW) of rooftop solar power**<sup>6</sup>.
7. A number of solar carports have already being constructed in the UK. For example in 2016, two car parks in Exeter city centre (situated on the top decks of Mary Arches and John Lewis car parks) were fitted with 150 kW solar carports. In 2020, the UK's largest solar carport was installed at Bentley Motors headquarters in Crewe. This large-scale solar carport consists of 10,000 solar panels, which have a capacity of 2.7MW, cover 1,378 car parking spaces and an area of 16,426m<sup>2</sup>. A report prepared by the Building Research Establishment ("BRE")<sup>7</sup> notes that there are here are over 17,000 parking facilities in the UK.

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6 <https://renewablesnow.com/news/overview-rooftop-solar-to-become-mandatory-in-several-german-states-in-2023-809103/>

7 [https://www.bre.co.uk/filelibrary/nsc/Documents%20Library/BRE/89087-BRE\\_solar-carport-guide-v2\\_bre114153\\_lowres.pdf](https://www.bre.co.uk/filelibrary/nsc/Documents%20Library/BRE/89087-BRE_solar-carport-guide-v2_bre114153_lowres.pdf)



8. In November 2022, the Guardian newspaper reported<sup>8</sup> on Legislation approved by the French Senate which requires existing and new car parks with space for at least 80 vehicles to be covered by solar panels. The owners of car parks with between 80 and 400 spaces have five years to comply with the measures, while operators of those with more than 400 will have just three years. This policy demonstrates the feasibility of “car park” solar.

#### **Innovative solar technologies will soon make ground mounted solar panels redundant**

9. There is constant innovation in solar generation technology such that it can now be deployed in a variety of existing settings. In five years time, we may all wonder why creating ground mounted “solar farms” was ever considered desirable. By way of example:
  - Thin Film Solar is a second-generation technology which requires the deposition of one or more thin layers, or thin film (TF) of photovoltaic material on a substrate, such as glass, plastic or metal. The resulting panels are lighter, easier to install and increasingly becoming more efficient generators<sup>9</sup>.
  - Solar Cloth is flexible material which generates electricity. It was originally developed by a Cambridge company as an easy to install option for existing buildings such as

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<sup>8</sup> <https://www.theguardian.com/world/2022/nov/09/france-to-require-all-large-car-parks-to-be-covered-by-solar-panels>

<sup>9</sup> <https://www.spiritenergy.co.uk/kb-solar-pv-thin-film-solar>

garage canopies. The technology is now making inroads into specialist markets led by a successful French company. Example of use include shading for green houses<sup>10</sup>.

- Solar Tiles are coming into use as an alternative to solar panels on domestic and commercial roofs. There are several designs and technologies in use but the most visible organisation promoting them is Tesla<sup>11</sup>. Other manufacturers are gradually entering the market.
- Other examples of the innovation and effective use of solar products include the proposed roll out of a 'solar membrane' West Ham's London Stadium (announced in February 24, 2023)<sup>12</sup>

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<sup>10</sup> <https://www.pv-magazine.com/2020/09/15/photovoltaic-shade-for-greenhouses/>

<sup>11</sup> [https://www.tesla.com/en\\_GB/solarroof](https://www.tesla.com/en_GB/solarroof)

<sup>12</sup> <https://romanroadlondon.com/london-stadium-olympic-park-solar-membrane-lldc/>